Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

BREEDING YEARLING BEEF HEIFERS

REUBEN ALBAUGH

HORACE T. STRONG

CALIFORNIA AGRICULTURAL
Experiment Station
Extension Service

CIRCULAR 433

TO HELP INCREASE THE COUNTRY'S MEAT SUPPLY

is the aim of this circular. Twenty million beef calves (approximately) are produced yearly in the United States; one half (10 million) are heifers. If 5 million of these heifers could be bred so that they would calve at two years, an additional 3½ million calves could be produced annually—assuming that these heifers produced a 70 per cent calf crop. If these calves were sold for veal when they weighed 300 pounds, our meat supply would be increased by 1,050,000,000 pounds. On the basis that each person eats an average of 150 pounds of meat per year, this yearling-heifer breeding program would supply 7 million people with their meat requirements.

THE DATA PRESENTED HERE

Involve 2,545 heifers on 15 California ranches, as well as experimental results from several research stations on breeding yearling beef heifers. They demonstrate that:

Meat production can be increased without increasing the number of breeding cattle.

THE COVER PHOTO shows a two-year-old Hereford heifer with crossbred Angus-Hereford calves, about two weeks of age. THE PHOTO BELOW shows a group of high-quality, well-grown-out, two-year-old heifers and their calves.

Greater economic returns are possible on ranches practicing the breeding method here outlined.

With proper feed and care, and by weaning and vealing the calf at 3½ months, the heifer's growth and development are not stunted; nor is the percentage of calf crop reduced at three years of age.

Breeding heifers to calve early in the year (December, January, and February) reduces mortality of heifers at calving time and decreases difficulty at calving.

Breeding yearling heifers to young, small-bodied, small-boned bulls may result in smaller calves at birth and less difficulty at calving time.

TO GET BEST RESULTS

Breed only thrifty high-grading heifers that weigh 600 pounds or more at breeding time.

Feed for continuous growth.

Give special care at calving time.

Veal calves at 3½ months of age.

Use young, small-bodied, small-boned bulls.

THE AUTHORS:

Reuben Albaugh is Extension Animal Husbandman, University of California, Davis.

Horace T. Strong is Extension Animal Husbandman, University of California, Berkeley.

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BREEDING YEARLING BEEF HEIFERS

REUBEN ALBAUGH • HORACE T. STRONG

WITH SUCCESSFUL MANAGEMENT breeding yearling beef heifers shows great promise of increasing meat supplies and improving ranch production efficiency without enlarging the numbers of breeding animals. The practice has already been carried on under many conditions, over long periods of time, and in several parts of the world.

Cattlemen who are successful in calving their heifers at two years of age rather than three rate proper feed and care high in their management book. Data collected on 15 California ranches involving 2,545 heifers indicate that in order for this early breeding program to be a success the seven rules listed in this circular must be rigidly observed.

Here are the seven rules that are recommended for success in your breeding program . . .

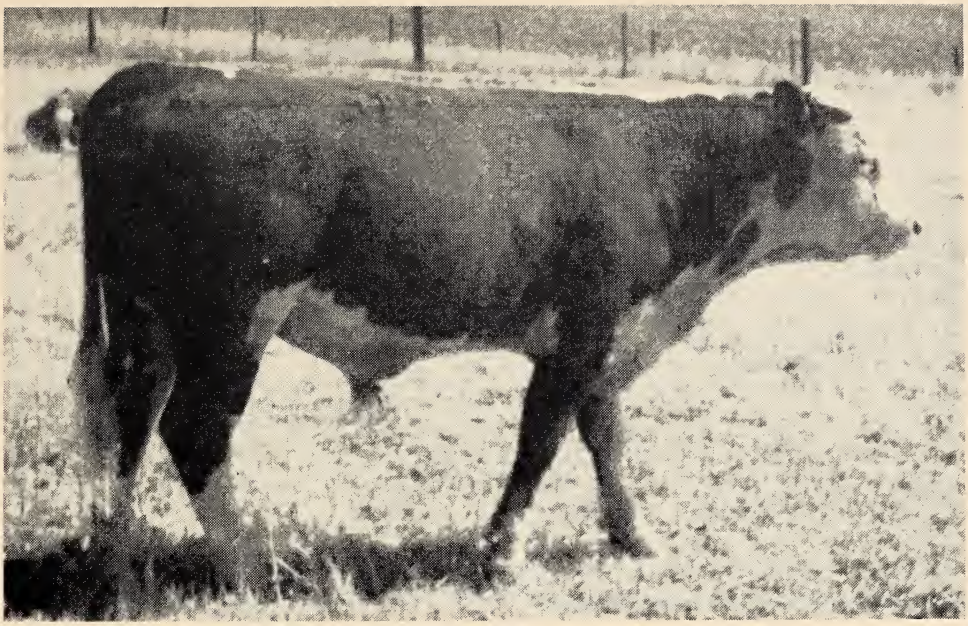
1 Breed only thrifty, high-grading heifers which weigh 600 pounds or more at breeding time.

Weight has been found more important than age by cattlemen who have successfully practiced this early breeding program. Usually it is only the large, strong, thrifty heifers that breed the first year and then raise a large percentage of their calves. It is generally the large heifer that has less trouble at calving time.

2 Keep heifers in thrifty growing condition by supplementary feeding during the short dry-grass season.

In California feeding the heifer for continuous growth after she is weaned and until she is approximately two and one half years of age is a good nutritional plan to follow. This is known as keeping the animal on a proper plane of nutrition. On most ranches, these large heifers are selected at weaning time and then supplemented on the range with approximately 1 to 1½ pounds of cottonseed cake per head per day until the range grass will furnish adequate nutrients for good gains. Heifers fed on the range in this manner should gain from ¾ to 1 pound per head per day, which is sufficient for breeding animals.

In the early fall after the heifers have been bred as yearlings they should be supplemented on the range with cottonseed cake or some other high-protein feed until the grass is again adequate to keep them supplied with proper nutrients. On some ranches where permanent irrigated pasture is available, the only supplementary feed necessary is some roughage, such as hay, to prevent bloat and scouring. Two-year-old heifers at the time they wean their first calves should weigh at least 800 pounds or more.



Above. If it is desirable to use Hereford bulls, this young, small-bodied and small-boned bull is a good type to breed to yearling heifers. Calves from this mating should not be kept for breeding purposes; they should be sold for veal at about 3½ months. Below. A good type Angus bull for breeding to young heifers.

TABLE 1—EIGHT-YEAR SUMMARY OF CROSSBREEDING EXPERIMENT, OHIO AGRICULTURAL EXPERIMENT STATION, WOOSTER, OHIO

	Calves from Angus cows								Calves from Hereford cows							
	Males				Females				Males				Females			
	Purebred Angus		Crossbred Hereford-Angus		Purebred Angus		Crossbred Hereford-Angus		Purebred Hereford		Crossbred Angus-Hereford		Purebred Hereford		Crossbred Angus-Hereford	
	*		*		*		*		*		*		*		*	
Gestation period, days	53	277.2	52	282.7	48	275.7	42	281.1	47	287.5	48	283.1	53	285.2	54	283.5
Birth weights, lb	53	62.4	52	65.9	48	56.1	42	62.7	50	69.2	48	67.0	54	67.8	54	62.6
Weaning weights, lb	49	486.2	50	472.6	42	419.7	42	446.9	46	393.7	46	432.4	51	385.7	48	394.3
Age at weaning, days	49	234.7	50	227.3	42	228.7	42	225.5	46	218.7	46	223.6	51	219.2	48	217.9
Average daily gain, birth to weaning	49	1.80	50	1.79	42	1.59	42	1.70	46	1.48	46	1.63	51	1.45	48	1.52
Average daily gain on pasture last 4 years only, 150 days	18	1.02	23	1.02	20	.85	23	.92	22	1.08	22	1.10	25	1.09	24	1.07

* Figures in these columns refer to number of calves used in calculations.

3 Breed heifers to small-bodied, small-boned, young bulls.

Small-bodied, small-boned bulls may have a tendency to sire calves that are small at birth. This is important in this early breeding program in order to prevent losses of both calves and heifers and to save time and labor. Young bulls are recommended, not because they usually sire calves which are lighter in weight, but because these young bulls are small, and are not apt to injure the heifers at breeding time. It is recommended that bulls which continue to sire calves that are small yet thrifty and vigorous at birth be kept and used in this early breeding program for as long as possible. This is true regardless of age, type, or breed.

Some cattlemen who practice this early breeding method use small-bodied, small-boned Angus bulls on Hereford heifers, because they believe the calf resulting from this cross is smaller at birth, is more vigorous, and produces better veal.

In 1942, 46 Hereford heifers on one ranch in Monterey County were bred to an Angus bull. Forty-two crossbred calves were raised and sold for veal. They were popular with the packer and brought top prices. No losses of cows or calves occurred.

Work carried on at the Ohio Experiment Station indicated that the gestation period of Aberdeen-Angus cows is about ten days shorter than that of Hereford cows. This shorter gestation period may have some bearing on the theory that the crossbred Angus-Hereford calf is smaller at birth.

In this test, 101 gestation periods for purebred Angus calves averaged 276.47 days; for 100 purebred Hereford calves, 286.28 days; for 94 crossbred Hereford-Angus calves, 281.98 days; for 102 crossbred Angus-Hereford calves 283.30 days.

On May 16, 1950, the Oklahoma Station at Stillwater, Oklahoma, established a test to compare Angus bulls on Hereford heifers to Hereford bulls on Hereford heifers. Twenty-three Hereford

A two-year-old Angus bull and yearling heifer.

heifers averaging 474 pounds at 441 days of age were placed in a pasture with an Angus bull. A similar number of heifers of the same weight and age were placed in a pasture with a Hereford bull. Both bulls were classed as medium-to-small in size and were considered comparable in that respect. The results of the test are presented in Table 2. A study of these data reveals that:

1) Crossbred calves were calved about five days earlier than the straight Hereford calves.

2) The crossbred calves were 6 pounds lighter at birth.

3) A larger number of crossbred calves were weaned.

4) At weaning time, crossbred calves were 17 pounds heavier.

5) A larger number of the cows raising crossbred calves were pregnant at weaning time, although all cows had been exposed to the same bulls for the same period of time.

One cattleman in Monterey County bred yearling Hereford heifers to a Brahman bull with fair results. This project was carried on for two years. This rancher reported that the calves were smaller at birth than straight Herefords, and very little trouble was experienced at calving time. The average birth weight of a representative group of crossbred Brahman-Hereford calves was 62 pounds. These calves made excellent veal and were popular with the packer. They brought a higher price per pound than did straight Hereford calves of similar age. Seventy-one heifers were involved in this test, and a 49.3 per cent calf crop was sold. This low calf crop may have been due to droughty feed conditions.

TABLE 2—SUMMARY OF THE CALVING PERFORMANCE OF TWO-YEAR-OLD HEREFORD HEIFERS BRED TO HEREFORD AND ANGUS BULLS AT STILLWATER, OKLAHOMA*

	Hereford Bull		Angus Bull	
	Number of cows bred to each bull			
	23		23	
Sex of calf	Male	Female	Male	Female
Number of calves born	9	11	14	8
Average birth weight (lb.)	64	63	60	55
Number of calves pulled	2	4	5	0
Number of calves lost at calving	2	1	0	0
Number of cows lost at calving	1	1	0	0
Number of calves weaned	7	10	14	8
Average birth date of calves	April 13	April 2	April 6	March 26
Average weaning weight of calves (10–4–51)	331	314	338	339
Average weight of cows raising calves	800	824	808	882
Number of cows found pregnant (10–4–51)	5	7	11	8

* This work was conducted at the Oklahoma A. & M. Experiment Station, Stillwater, Oklahoma, by Doyle Chambers, Associate Professor of Animal Husbandry, and J. A. Whatley, Jr., Associate Professor of Animal Husbandry.

These excellent yearling heifers averaged 671 pounds when bred to a Brahman bull.

4 Wean and sell for veal the calves from the two-year-old heifers at about 3½ months.

When the calf is weaned at this age, the cow has a chance to grow and develop. Weaning these calves early *may* help prevent the occurrence of nonbreeders and insures a large calf crop when the heifers are three years of age.

Observations on one ranch in Monterey County were that the percentage of calf crop from three-year-old heifers was 10 per cent higher on heifers that calved at two years over those calving for the first time as three-year-olds.

The average percentage of calf crop on this ranch for twelve years for mature cows was 89.64 per cent. This involved about 500 breeding cows per year. Had the breeding of the yearling heifers interfered with their ability to conceive as two-year-olds, this percentage of calf crop would have been materially lower. These heifers were about 27 months of age when their first calves were weaned. They weighed 803 pounds at that time. This indicates that breeding them as yearlings did not stunt their growth.

Cows at the Union Station in Oregon that had calved as two-year-olds produced a 79.6 per cent calf crop at three years of age. At four years the percentage of calf crop was 86.1, at five years 94.7, and at six years 83.3.

Many authorities believe that milk production is the main drain on these young heifers, and therefore it is strongly recommended that they nurse these calves only until the calves are large enough to be vealed. Evidence accumulated by Professor S. W. Mead at the University of California Experiment Station shows that weaning the calf at 3½ months has no retarding effect on the future milk production of the cow.

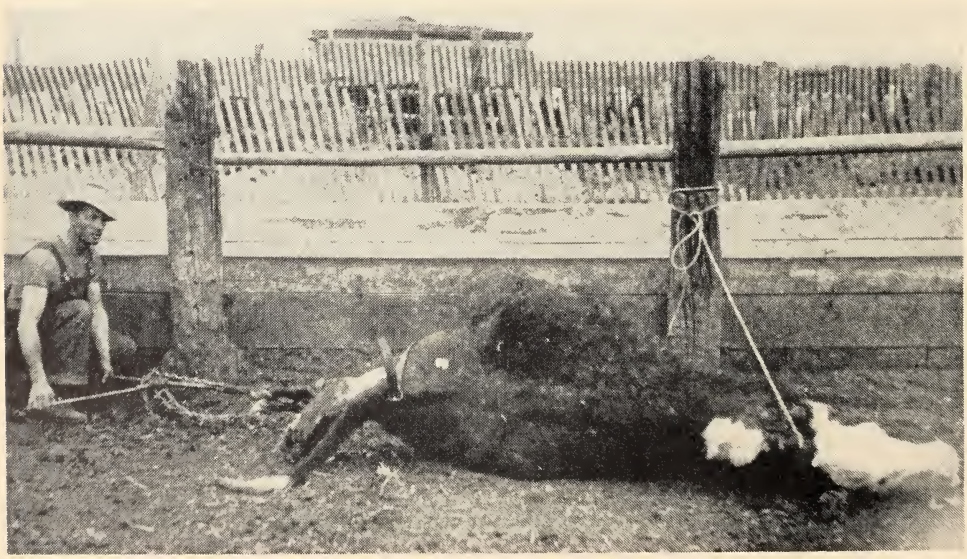
The following paragraph taken from Roscoe R. Snapp's new book entitled "Beef Cattle" may help to explain this theory: "There is much evidence that gestation has a less stunting effect upon immature heifers than has lactation. This statement seems reasonable in view of the fact that the new-born calf contains only about 15 pounds of protein and 3 pounds of fat, whereas about 65 pounds of protein, 70 pounds of fat, and 90 pounds of carbohydrates are in the milk produced by the young mother during the first 4 months of lactation."

5 Give special care and attention to the heifers at calving time.

When these young heifers are ready to calve, they should be placed in small fields equipped with corrals and other facilities for restraining and handling heifers that have difficulty calving. They should be watched constantly by an experienced person. If a heifer has difficulty calving she should be driven slowly and carefully into one of these small corrals, where assistance can be given.

The new, approved calf-puller is a valuable piece of equipment for anyone employing this early breeding program. This equipment should be carefully and

A calf puller in operation. This is a valuable piece of equipment for any cattle ranch. The operator should be sure the calf is in correct position for delivery before applying puller. If it is not, a veterinarian should be called.



intelligently used. The California Stockmen's Supply in San Francisco, California is one company carrying this product.

6 Breed heifers so that most will calve during December, January, and February (later, of course, in the cold, high country).

Tests on one ranch in Monterey County, involving 1,511 heifers and covering 16 years, have shown that heifers which calve early in the year (December, January, and February) have less difficulty calving and produce a higher percentage of calves than those bred later in the year. For example, when the heifers were bred during April, May, and June heifer mortality was 4.1 per cent, and the calf crop sold was 53 per cent. When bred in February, the mortality of heifers was less than 2 per cent, and the calf crop sold ranged from 69 to 94 per cent. It is felt, however, that when the calves arrive after the range feed has become abundant the high-protein diet causes the calf to be large, resulting in difficulty at calving time. This theory has not been proved experimentally.

7 Breed only a few heifers the first year of the program—allow the operator to gain experience in managing the project. The same is true of any beef-cattle-improvement program where the human element is closely involved.

Results of field tests secured on 15 California ranches (See Table 3) demonstrated that beef production can be increased, and at the same time greater economic returns can be enjoyed when beef heifers are bred to calve at two years of age. These data from 15 ranches involving 2,545 heifers, producing 1,718 calves and including 16 years of records on one ranch, show a total production of 486,194 pounds or 243 tons of meat with a gross return of $108,420.26. The average return of these heifers in dollars and cents as two-year-olds was $59.00 for each heifer which produced a calf. The average production per heifer bred amounted to 193 pounds, or 247 pounds per heifer calved. The averaged mortality of heifers at calving time was 2.1 per cent. This amounted to $2.05 loss per heifer bred (See Table 5). The per cent of calf crop sold averaged 67 per cent. Loss of calves from calving to veal age was 15.6 per cent.

The Oregon Experiment Station at Union found that beef cows which first calved at two years were more profitable than those which first calved at three. The difference between the two groups at the end of four years was $36.15 per head. At the end of six and one half years, the cows that had calved first at two years had produced .7 more calves than those first calving at three. When five years old, the cows that had calved at two years at this eastern Oregon Station were about 100 pounds lighter than those first calving at three; but were producing as many calves of an equal size, and so were just as valuable from the standpoint of breeding purposes. The possible reason these early bred cows were lighter in weight at the end of five years was because their calves were allowed to nurse until they were from six to seven months of age.

Herman Oliver, prominent cattleman of John Day, Oregon, has been breeding yearling beef heifers for several years. In an address delivered at Baker, Oregon, before the Oregon Cattle and Horse Raisers' Association on May 18, 1948, he gave the following report:

"We are calving two-year-olds successfully. There used to be an opinion in our country that calving heifers at this age tended to reduce the size of the mature cow. The opinion was also that there would be a light calf crop the following year when the cows were three years old.

TABLE 3—SUMMARY OF A SIXTEEN-YEAR YEARLING HEIFER BREEDING PROGRAM ON ONE RANCH IN MONTEREY COUNTY*

Year	Number heifers bred	Month bred	Kind of bull	Per cent of heifers		Per cent calves died	Per cent calf crop sold	Average weight calves sold	Average price per cwt.	Per heifer bred		Per heifer calved	
				Calved	Died calving					Pounds sold	Value	Pounds sold	Value
1937–43	677	Apr–June	Hereford—2-yr.	70	4.1	23.6	53	222	$ 9.32	119	$11	170	$16
1944–47	339	Feb.	Hereford—2-yr.	75	.9	7.9	69	234	15.75	166	26	216	34
1948	85	Feb.	Hereford—2-yr.	75	1.2	7.8	69	338	28.00	235	66	312	87
1949	86	Feb.	Hereford—2-yr.	85	2.3	4.1	81	269	21.00	217	46	258	54
1950	84	Feb.	Hereford—2-yr.	99	0	4.8	94	274	25.00	258	64	261	65
1951	87	Feb.	Hereford—2-yr.	88	2.3	3.9	85	321	33.00	273	90	308	102
1952	153	Feb.	Hereford—2-yr.	87	0	18.8	70	268	32.80	189	62	217	71
Total	1511												
Average				77	2.4	14.9	65	269	$ 18.15	169	$32	275	$51

* These data were accumulated by Rudolph Asmus, Manager, of the El Sur Ranch, Monterey, California.

TABLE 4—SUMMARY OF RESULTS OF BREEDING YEARLING HEIFERS IN CALIFORNIA

County	Year	Number ranches	Number heifers bred	Weight at breeding	Month bred	Kind of bull	Per cent of heifers		Per cent of calves died	Per cent calf crop sold	Average weight calves sold	Average price per cwt.	Per heifer bred		Per heifer calved	
							Calved	Died calving					Pounds sold	Value	Pounds sold	Value
Imperial	1951–2	4	136	600–750	April Sept.	Hereford Angus Charbray	..	0	....	88	547	$ 35.00	483	$169	...	...
Madera	1951–2	1	245	650–750	Feb Mar.	Angus	90	1.2	13.6	78	425	31.10	330	103	368	$114
Monterey	1937–52	6	1,925	580–670	Feb. June	Hereford Angus Brahman	77	2.4	14.9	66	243	16.60	160	27	229	42
Shasta	1950–1	1	63	650	Sept. Nov.	Hereford	95	3.2	25.0	71	443	35.00	316	111	332	116
Stanislaus	1950–2	1	109	700	Jan.	Angus	..	0	....	86	366	33.50	316	106	...	...
Sutter	1951	1	67	600	Apr. May	Angus	98	0	28.8	70	445	35.90	311	112	317	114
Total Average			2,545	580–750	....	.....	87	2.1	15.6	67	283	22.30	193	43	257	59

TABLE 5—VALUE LOST THROUGH MORTALITY OF HEIFERS

County	Number heifers bred	Per cent died calving	Loss per heifer bred*
Imperial	136	0	$ .00
Madera	245	1.2	1.84
Monterey	1,925	2.4	2.22
Shasta	63	3.2	4.76
Stanislaus	109	0	0
Sutter	67	0	0
Total	2,545		
Average		2.1	$ 2.05

* Losses were based on the following valuations per heifer died.

1937–43	$80 per head
1943	90 per head
1944–47	100 per head
1948–52	150 per head

Our experience does not bear this out. Our two-year-olds always raise a good calf and breed satisfactorily the next year.

"For breeding to the yearling heifers, the smaller type bulls that may be in the bull herd are selected. During the winter these heifers are fed wild hay in racks so that they will have ample feed before them at all times. About 30 days before calving time, they are given a couple pounds of grain or its equivalent in some other concentrated feed. This grain feeding is continued when they are on grass. Beginning as yearlings, the heifers are pastured and wintered in straight aged lots. In the spring when they are three years old, they are mixed with the mature cows.

"We calve early, beginning on the sixteenth to eighteenth of February with mature cows, and March 1 with heifers, usually having 80 per cent of the calves dropped by April 1."

The Utah Experiment Station located at Logan, Utah, presents the following

Braford calves raised by two-year-old Hereford heifers. The calves are about 2 months of age.

data regarding breeding of range Hereford heifers as yearlings to a Hereford bull:

1) Calving at two years of age did not stunt range cows that were well fed during the winter.

2) Conception rate was not high in yearling range heifers, especially smaller and younger individuals.

3) Heifers calving at two years of age had difficulty in calving.

4) When both groups were six years of age, cows calving first at two years weaned an average of 1.03 more calves that were 10 pounds heavier than did cows that calved first at three years of age.

5) The early calving group had in the fall, when both groups were six years old, weaned an average of 1,236 pounds of calf per cow compared to 865 pounds of calf per cow for the group that calved first at three years. The difference of 371 pounds in favor of early breeding was a result of the cows raising an average of 1.03 more calves per cow and the calves averaging 10 pounds more in weight.

The workers conducting this study suggest that if animals are small, or if the operator cannot give them proper attention during calving, it is doubtful that the practice of breeding yearling heifers should be recommended. They reasoned that ranchers should not breed heifers as yearlings unless adequate feed supplies are available to grow the heifers out to a large size at the time of calving.

The completeness of these data on breeding yearling beef heifers as secured under field conditions in California is such that many authorities feel that, with adequate nutrition and proper care and management, this type of breeding program will increase the efficiency on many beef-cattle ranches without increasing numbers of breeding animals. The program shows the possibility of increasing the size and quality of the calf from the heifer when she calves the second time (three years of age) and affords a natural

A two-year-old Hereford heifer with calf of vealing age.

method of selecting a cow herd that should prove to be good mothers. Some breeders who are practicing breeding of yearling heifers have observed that these young heifers which breed at an early age take better care of their calves and produce more milk than those that fail to breed this early. There are no experimental data available to support these observations.

Group of crossbred Angus-Hereford calves from two-year-old heifers (average 243 pounds). Calves from this cross are usually polled and black-bodied with a white or mottled face.

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